Birth Order and Parental Time

Evidence from Norway

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Summary

The motivation behind this study is the fact that previous empirical works have established that children with different birth order positions have different educational performance.

There are some studies that point out that in developed countries, higher birth order positions (i.e. the younger children within a family) have poorer academic outcomes in comparison with older siblings (Black et al, 2005). However, studies in developing countries show an opposite pattern (de Haan et, 2014).

According to some studies, the effect of birth order on child performance may be explained by various factors, for example Monfardini and See (2012), Price (2008). My objective in this thesis is to investigate whether certain factors, such as, the total time and quality time that parents invest in their children, depend on birth order positions. Quality time refers to activities such reading with (or to) the child, holding conversations with the child, eating together, playing, doing homework, doing sports together, etc. Therefore, my results will contribute to the empirical research that looks for explanations of why birth order is a determining factor of a child's educational success.

The analysis in this thesis uses data from the Norwegian Time Use Survey, 2010. My empirical strategy is based on estimates from a multiple regression model. I evaluate the impact of birth order on parental time controlling for child-specific characteristics, such as, gender and age; family characteristics such as family size, parent's age, parent's gender, parent's labor status, parent's education level and parent's civil status. Interaction terms were added to evaluate whether birth order depends on child and family characteristics.

Additionally, I made use of the fixed effects approach for estimating the effects of birth order on parental time, while controlling for all unobserved family characteristics that are the same for children from the same family.

Results report that later-born children receive less parental total time and less parental quality time in comparison with early-born children. Multiple regression models reflect that these birth order differences have negative and significant effects on parental time when the models are controlled for child and family characteristics. However, in the fixed effect model, only

second-born children exhibit negative and significant effects caused by a reduction in parental total time.

Family size and child's age are the factors that contribute most to the birth order effects that explain the parental total time and quality time. Results show that parents reduce the total and quality time given as their children grow older.

In multiple regression models, mothers have a direct contribution that affects positively to the time that parents spend with children. However, working parents yield negative and significant effects on both parental total time and quality time given. On the other hand, married parents has negative and insignificant effect and parents with high education have insignificant effects on both parental total time and quality time.

Girls show positive and large significant response to parental total time, however, within a family, parents allocate approximately the same quality time regardless of the gender of the children.

It is important to mention that potential sources of omitted variable bias can lead to possible threats to the validity of the models. Differences among siblings (birth spacing, special or skilled children) can influence the way that the parents allocate time resources to their children. Therefore, some extensions to this work may be done.

Preface

This thesis is being presented as a completion of the Master of Philosophy in Economics. Acknowledgement goes to my supervisor Edwin Leuven, who contributed with his academic support throughout the process of writing my thesis. Furthermore, I like to thank Prof. Monique de Haan who gave me the preliminary orientation in my project plan. I want to express my gratitude to my husband Jorge Torres who has been my biggest support in every challenge I have undertaken.

In addition, I want to express thanks to *Norsk samfunnsvitenskapelig datatjeneste* (NSD) that gave me access to Time Use Survey, 2010. Statistics Norway collected the Time Use Survey, 2010. NSD organized and made available the data in an anonymous form. The data used in this thesis corresponds to the "Time use survey, 2010, diaries". Neither Statistics Norway nor NSD are responsible for the data analysis or interpretation presented in this thesis.

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1 Introduction

Children from different families and within a family exhibit different outcomes. For instance, some children have good results at school meanwhile others show poor educational performance. Many research works seek to explain these differences, for example, Heiland (2009); De Haan (2010); Lehmann et al (2012). Some possible justifications are that parents allocate resources depending on children characteristics as gender, age, birth order position, and some other factors; or depending of family characteristics as family size, household income, parent's labor status and education level, among others.

Many empirical studies have identified a link between birth order and children outcomes. Mostly of these works have found that in developed countries higher order birth positions (i.e., later-born child) have poorer outcomes in comparison with older siblings. Among these works we find, Argys, (2006), Bertoni and Brunello, (2013), Gugl and Welling, (2010), Conley et al, (2007), Silles, (2010), Bonesrønninga and Massihb, (2011), Hotz and Pantano, (2013). Conversely, other studies have shown a reversed pattern in developed countries, i.e., higher order positions have better outcomes, that is the case of Behrman and Taubman, (1986), Datcher-Loury, (1988), as well as in developing countries, Ejrnæs and Pörtner, (2004), de Haan et al, (2014).

Certain works attempt to point out why birth order positions have effects on a child's achievements. Such is the case of Price (2008), who studies the impact of quality time that parents spend with their children. He found that a first-born child receives more cumulative parental quality time than a second-born child up to a certain point in his / her life. This is due to the eldest child enjoying time alone with his/her parents before next child is born. After this last event, parents try to allocate equal time between siblings, and consequently, is the first child who receives more cumulative parental quality time. This is a possible input that explains the impact of birth order on children outcomes.

Therefore, using data from the Norwegian Time Use Survey, 2010, I investigate whether the time children receive from their parents depends on birth order.

I use regression to estimate the effects of birth order on both parental total time and parental quality time.

In multiple models, child's age, girls, and mothers, have a direct contribution in explaining parental total time. These characteristics also contribute in explaining the parental quality time except for girls that have not influence on the model.

The family fixed effect approach seeks to explain the effect of birth order on parental time while controlling for all unobserved family characteristics that are the same for children from the same family. Including the age of the child into the models makes the birth order coefficients lose significance.

Results report that lower birth order positions receive more parental time than higher order receive. However, within families birth order has insignificant effects. Only second-born children exhibit significance for parental total time.

Birth order depends on whether parent's gender is a father or mother for both total time and quality time. Nevertheless, birth order is not affected regardless child's gender. Only parental quality time is affected by parent's labor status for an increase in the birth order position.

Birth spacing between siblings and special children could be factors that influence the way that the parents allocate time resources to their children. Thus, possible threats to validity could arise due to changes on the real birth order position caused by these factors.

The structure of this thesis is as follows. Chapter 2 presents the literature review for birth order effects. Chapter 3 describes the data source and the selected variables. Chapter 4 illustrates the methodology and discusses empirical results. Finally, chapter 5 concludes.

2 Literature review

This section reviews some previous research and describes the findings in connection with birth order or in association with parental time.

2.1 Birth order and outcomes

Some research works study how birth order affects children's intellectual development. For instance, Zajonc and Markus (1975) study the effect of birth order and family size on intelligence. They found that the intelligence of a child is influenced by the intellect of its siblings and parents. Additionally, their results show that a large age difference between children benefits younger siblings. It is common for older siblings to obtain a level of maturity from teaching their younger siblings. Younger children may cause a reversal in the relationship between birth order and intelligence. Black et al (2011) measures birth order effects on IQ, finding that later-born children have lower IQ. One explanation of this strong and significant effect is that the quality of pre-natal care may differ by birth order position.

Generally, studies have pointed out that first-born children have advantages over their younger siblings. For example, Conley et al (2006); Silles (2010); Bonesrønning and Massihb (2011) and Hotz and Pantano (2013) found that first-borns perform better in school than middle-born and last-born children do. Silles (2010) also shows that first-born and last-born children behave better at school than middle-born children. Moreover, Kalb and van Ours (2013) show that parents who read to young children have an important effect on the development of reading and cognitive skills in the children. However, they find that birth order and family size do not have a direct effect on the child's reading capacity. Leibowitz (1977) studies time inputs by parents on children's verbal development.

Some other research works study how birth order affects children's behavior. For example, Argys, (2006) found that higher birth (middle and last) positions are more likely to engage in risky behaviors. Smoking, drinking, marijuana use, sexual activity and crime are associated with birth order positions. In the same way, Aizer (2004) concluded that it is likely that children have risky and anti-social behaviors when they experiment lack of adult supervision. These behaviors have an impact on the child's development and adult outcomes.

Other papers also study the effects of birth order on children outcomes, such as educational attainments and future income. For instance, Black et al (2005) studied the effect of family size and birth order on children's educational achievements using data from Norway. They found a negative relationship between family size and children's education and a significant and large negative relationship of birth order on children's education. In a similar study, Booth and Kee (2009) found that siblings' shares of the family's educational resources decrease with birth order. Bertoni and Brunello (2013) study the effects of birth order on earnings. They found that a first-born earns more than a later-born at the beginning of the life work. They argue that this difference is due to the first-born having a higher level of education than a later-born.

De Haan (2010) studies the relationship between family size, birth order and children educational attainment. The results show that family size has no significant impact on educational attainment; meanwhile, birth order has a significant negative effect. A possible explanation behind the birth order effects is that parents provide more resources to the elder child. Lehmann et al (2012) evaluates the birth order differences in early childhood inputs and adult labor and education attainments. They find that younger siblings receive less attention than first-borns do, affecting the development in future outcomes.

It is highlighted that the results from some others studies suggest an opposite interpretation. For instance, Behrman and Taubman (1986) studied birth order effects on schooling and earnings. They found a significantly negative effect of being a first-born. Datcher-Loury (1988) looked for a direct link between maternal childcare time and children's outcomes as adults, finding that older siblings experience a poorer level of schooling.

2.2 Family inputs and Parental time

Parents' education also affects the time that parents share with their children. In earlier studies, Hill and Stafford (1980) found a positive relationship between maternal education and the quantity of time spent with children. They concluded that parents who are more educated spend more time with old children. Guryan et al (2008) found that highly educated parents and parents with high income spend more time with their children, having significant effects on children development. Findings of Sepahvand et al (2013) confirm that parents with higher education invest more in child human capital. Bianchi and Robinson (1997) found also

a link between parental contributions and child attainments. Parents that are better educated provide better education to their child, giving the necessary social capital for their intellectual development.

2.3 Birth order and Parental time

The following studies are closer to my research work. My results are compared with their findings. Monfardini and See (2012), studied whether maternal quality time is the driving force behind birth order effects. They found negative and significant correlation between birth order and maternal quality time. A detailed study by Cardona (2012) point out that a first-born receives more attention in activities with the mother when a new sibling is born. In a similar investigation on the level of involvement that parents have with their children, Schoppe-Sullivan et al (2013) find that birth order positions play a relevant part in parents' engagement. The results show that mothers are more engaged with later-born children, while fathers are more engaged with early-born children.

Osmanowski, Gugl and Welling (2010) consider that the birth order effects depend on the financial and time resources that parents provide to their children over time. They find that first-borns obtain more resources overall that a second-born children do. Some authors conclude that parents create dissimilarities between siblings because they try to evenly distribute the family resources with the aim of being fair and equal (Hertwig et al 2002). Bagger et al (2013) found similar results from a different point of view. They found that parents share resources differently with their children according with the birth order position. This differential has impact on years of education. Later studies show that parents invest more in highly-skilled children (Cardona and Diewald 2014). Heiland (2009) reports that first-born children benefits of greater parental inputs.

In developing countries, for instance, results show an opposite pattern with respect to the tendency of the developed countries. Ejrnæs and Pörtner (2004) use data from Philippines. They show that younger children receive more education than older children do, being less pronounced in families where parents have more education. Likewise, using data from Ecuador, De Haan et al (2014) find positive and persistent effects of birth order on human capital development. The quality time that an older child receives from the mother is less than

that received by a younger sibling. The younger child has higher cognitive development and more possibility to go to school.

Very little literature explains the inputs that cause the different outcomes between children. For example, Price (2008) found a possible explanation that shows significant effect of birth order on children outcomes. Using data from U.S.A., he examined whether parental time spent with children depends on the birth order position. He argues that parents try to dedicate equal time to each child at any point in time. As a result, he found that a first-born child receives about 20-30 more minutes of quality time daily compared to a second-born child of the same age from a similar family. Moreover, he observed that the amount of parental quality time decreases as children get older.

Therefore, continuing with the interest of finding inputs, particularly, I explore whether there is a connection between birth order positions and the time a parent spends with a child. My results will contribute with the literature that seeks to explain the inputs that cause an impact on a child's attainments.

3 Norwegian Time Use Survey

Statistics Norway has conducted the Time Use Survey every ten years. The first survey started in 1971 and was conducted again in 1980, 1990 and 2010. These surveys contain information of how the respondents use the time, when and where they performed the activities, and who else were present during the activities. The data was collected using questionnaires and diaries of activities. The questionnaire takes about 20 minutes through a telephone or direct interview, then the respondents fill in the diary of activities for a period of two ordinary days.

The data used for this research correspond to the Time Use Survey of 2010, collected by Statistics Norway from February 2010 to March 2011. For this survey, Statistics Norway took a sample of 8500 persons from the National Register of Norway. This sample represents people from the whole country aged between 9 to 79 years old. The gross sample consisted of 8278 people due to 222 persons who were outside the target population. About 59% of the gross sample participated in the interview. However, a net sample of 3979 people joined the whole survey process (interview plus questionnaire) representing 48% of the gross sample.

The data was provided by *"Norsk Samfunnsvitenskapelig Datatjeneste"* (NSD, in norwegian). The data contains 7958 records, which correspond to information of the interview and two days of activities for the net sample of 3979 respondents. Respondents wrote the activities in a time sheet, duration, and which of the household members were present during the activity. All this information was processed and classified into 3118 variables which are divided into 16 main categories: activities, work and income, background, housing, family members, leisure, performance period, health, household, immigration, technical variables, travelling, tax, social benefits, weight and friends. For the purpose of this study, I selected some variables of personal interest that correspond to activities and background. In the survey, the activities are classified into 167 codes. I selected the codes that refer to activities where the child is the focus of attention and I refer to them as quality time activities. Annex A shows the list of activities selected as quality time activities in a parent – child relationship.

About 48% of my net sample contains respondents who live alone and couples without children. Hence, the sample is limited to those parents that performed the activities with

merely children. Consequently, the data for the regression analysis consist of 1813 observations that represent 23% of the data registered.[1]

3.1 Descriptive statistics

In this section, the data is organized, summarized and presented in descriptive statistics. The tables report the average in minutes and the variation from the mean for both dependent and independent variables, without controlling for child and family characteristics. These factors affect the time that parent – child spend together and are discussed in section 4.

Dependent or outcome variables are the cumulative total time and cumulative quality time. The latter was calculated according to my selection criteria for the activities listed in appendix A. The independent or explanatory variables are the variable of interest, birth order, and the control variables for child and family characteristics.

3.1.1 Explanatory variables

Table 1 contains the summary statistics of the data for explanatory variables, which correspond to child characteristics and family characteristics.

Table 1 shows that there is an even distribution between boys and girls. The number of children in a family varies from 1 to 4 children. Almost 50% of the data contains families with two children. Only 3% of the families have four children. Therefore, the analysis is limited to families having up to three children. We may also see that there are as many mothers as fathers in the data. The age of the parents varies from 21 to 64 years. Most parents in the sample are married. About one in seven parents have higher education, while the same proportion of parents have either basic education or high school. There are high proportion of parents that are working.

[1] Annex B provides the analysis code in Stata format

Table 1. Summary statistics for explanatory variables, data: Time Use Survey 2010

Child and family characteristics variables	Mean	Std. dev.
Birth order	1,5	0,7
Child's gender	1,5	0,5
Girl	49 %	
Child' age (years)	9,1	4,8
Family size	2,1	0,8
One-child family	24 %	
Two-child family	48 %	
Three-child family	25 %	
Parent's gender	1,5	0,5
Mother	52 %	
Parent's age (years)	39	6,9
Civil status	1	0,6
Married	66 %	
Education level	2,6	1
Higher education	15 %	
Labor status	1	1,6
Working	91 %	
Number of observations	1813	

3.1.2 Outcome variables

Table 2 presents the outcome variables. It contains the average total time and average quality time in minutes that a Norwegian parent spends with a child during a two-day period. The standard deviation is significantly high compared with the mean value. This variation is normal when the registered data corresponds to short periods.

Table 2. Summary statistics for outcomes variables, data: Time Use Survey 2010

Outcome variables	Mean	Std. dev.
Total time (minutes)	553	349
Quality time (minutes)	131	109
Caring for children	49 %	
Meals	36 %	
Sports and outdoors	15 %	
ln(Total time)	6,07	0,8
ln(Quality time)	4,59	0,8
Number of observations	1813	

The data shows that approximately 24% is considered as quality time. In this study, Quality time is grouped into three main categories. Results reveal that Norwegian parents dedicate more time in taking care of the child.

Figure 1 illustrates the distribution of parental quality time by codes of activities for the three main categories in a parent-child relationship.

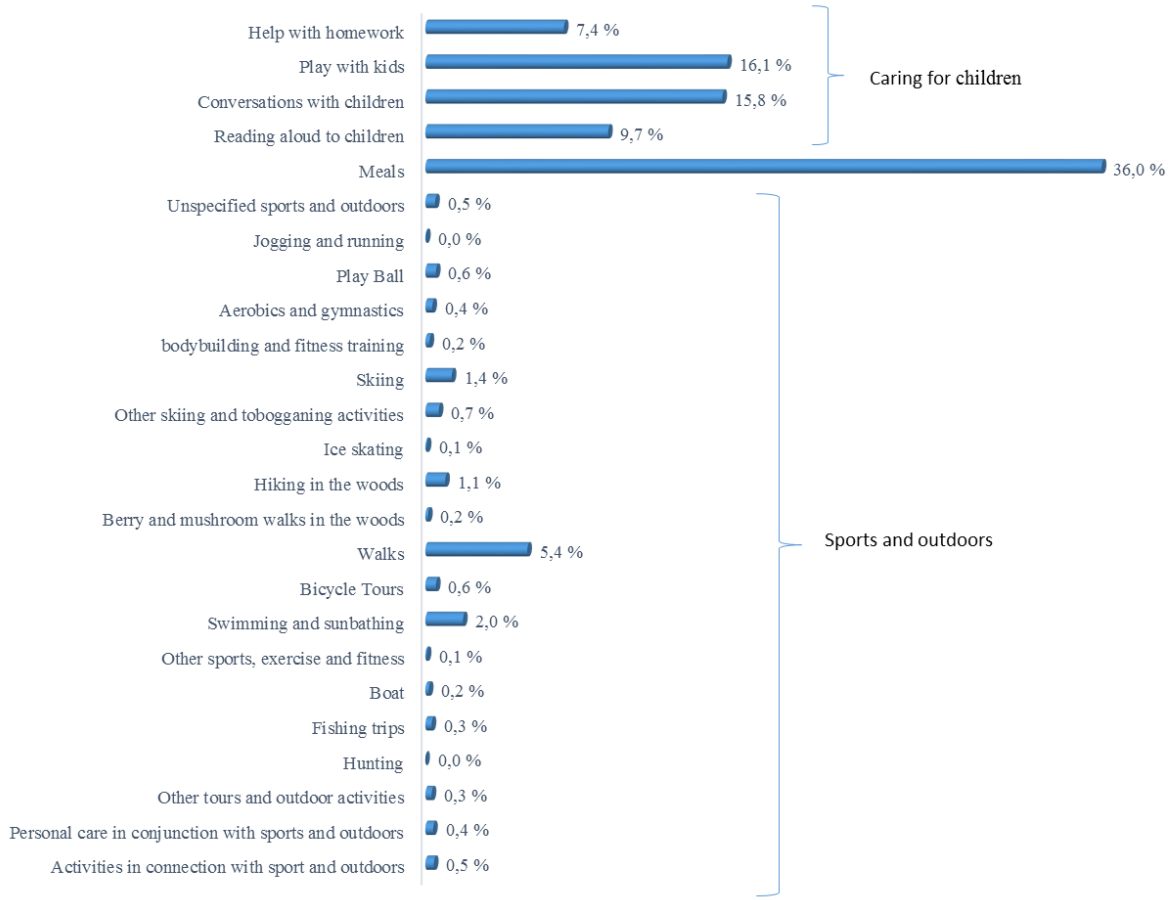

Figure 1. Distribution of parental quality time by activities, data: Time Use Survey 2010

The time used in having meals together is nearly equal to the total time that a parent spends in playing and having conversations with children, as can be seen in figure 1.

The data show that a parent spends less time in doing sports and outdoors activities together with children. The sum of this category reaches approximately 15% of the quality time.

Table 3 shows the summary statistics for the outcomes variables by groups of children, first-born and later-born children.

Table 3. Summary statistics birth position, data: Time Use Survey 2010

	First-born		Later-borns	
Outcome variables	**Mean**	**Std. dev.**	**Mean**	**Std. dev.**
Total time (minutes)	546	355	561	340
Quality time (minutes)	129	113	133	104
Caring for children	44,6 %		48,9 %	
Meals	44,9 %		42,3 %	
Sports and outdoors	10,5 %		8,8 %	
ln(Total time)	6,05	0,8	6,11	0,8
ln(Quality time)	4,57	0,8	4,62	0,8
Explanatory variables	**Mean**	**Std. dev.**	**Mean**	**Std. dev.**
Child's gender	1,50	0,5	1,48	0,5
Girl	50 %		48 %	
Child's age	10	4,9	7	4,0
Family size	1,76	0,7	2,49	0,6
One-child family	41 %			
Two-child family	43 %		56 %	
Three-child family	15 %		39 %	
Parent's gender	1,53	0,5	1,51	0,5
Mother	53 %		51 %	
Parent's age	40	7,4	39	6,0
Civil status	1,46	0,7	1,34	0,6
Married	63 %		71 %	
Parent's education level	2,61	1,0	2,62	1,0
Higher education	14 %		16 %	
Labor status	1,43	1,6	1,41	1,6
Working	91 %		92 %	
Number of observations	1030		783	

Approximately 57% of observations are first-born children. The remaining percent are the sum of second, third and fourth-born children. The average of quality time that a first-born receives is 24% of the parental total time, which is the same quality time that later-born children receive.

We observe in table 3 that, in general, both child and family characteristics are nearly evenly distributed between first-borns children and the other birth order positions. The larger proportion of married parents is observed in families that have two or more children.

3.2 Child and family characteristics effects on parental time

This section shows the direct contribution of child and family characteristics on parental total time and parental quality time.

Table 4 provides the results of the regressions for logarithms of total time and quality time by one observation per family. Results shows that for an additional child in the family the logs increase about 0.74, i.e., both total time and quality time double. For families with three children both total time and quality time increase by nearly three times.

Table 4 also shows interesting results. Girls receive significantly more total time than boys receive from a parent. A possible explanation is founded in the report *"Tidene skifter, tidsbruk 1971-2010"*, (2012) by Statistics Norway, where it is shown that girls participate about 10% more in household's activities than boys, for example, preparing food. Previous studies found similar results. For example, Mammen (2011); Gugl and Welling (2012) found that boys and girls face different trade-offs, receiving different parental time. Therefore, children show different outcomes from each other.

In my results, the differences in quality time between boys and girls are insignificant. A possible explanation is that Norwegian culture is based on equality. Baker and Milligan (2013) found different results. They studied the time that parents spend with a boy and a girl in teaching activities such reading, using numbers and letters. They found that girls receive more attention than the boys receive. In addition, Baker and Milligan (2013) concluded that mothers' characteristics are linked to these differences between the genders.

I found that maternal time has a significant effect on total time that children receive. Maternal time also has a significant effect on quality time but in lesser proportion than total time. Usually, Norwegian mothers benefit from the share period of parental leave. This could be an explanation of why mothers invest more time with their children.

Table 4. Effects of child and family characteristics on parental total time and quality time per family

dependent variable:					
		logTtime		logQtime	
Regressor		**[1]**		**[2]**	
Family size					
	1	(base)		(base)	
	2	0,73	***	0,74	***
		[0,05]		[0,05]	
	3	1,06	***	1,05	***
		[0,07]		[0,07]	
Girls		0,12	**	-0,03	
		[0,05]		[0,06]	
Child's age		-0,06	***	-0,07	***
		[0,01]		[0,01]	
Mother		0,22	***	0,11	**
		[0,05]		[0,05]	
Parent's age		0,01		0,01	
		[0,00]		[0,00]	
Married		-0,09	**	-0,04	
		[0,05]		[0,05]	
Higher education		0,01		-0,04	
		[0,07]		[0,07]	
Work		-0,26	***	-0,17	**
		[0,07]		[0,08]	
constant		6,18	***	5,04	***
		[0,20]		[0,23]	
N		1015		994	

These regressions were estimated using data from Time Use in Norway 2010. Robust standard errors are given in parenthesis under coefficients. The individual coefficient is statistically significant at the (***) 1% level, (**) 5% level or at (*) 10% level using a two-sided test.

Table 4 also shows that child's age coefficients are negative and significant. An additional year in child's age indicates that both total time and quality time that children receive from their parents is reduced by about 7%. A possible explanation is that children get certain grade of maturity as they get older and make them more independent from parental care.

Table 4 reports that married parent has a negative and significant effect on total time. An explanation for this result could be that married parents can share the care with their partner.

However, a married parent has negative but insignificant effect on quality time, perhaps because of a strong sense of fairness in the distribution of quality time among children.

A higher educated parent insignificantly slightly increases the total time that give to the children, while an insignificant reduction of quality time can be observed. These results are not in concordance with the findings of Hill and Stafford (1980).

A parent that spends more time in the labor market has negative and significant effects on total time that children receive. In the same way, a parent that works has negative and significant effect on quality time. In the literature, I found negative effects of working parents on parental time. For example, Rapoport and Le Bourdais (2008) investigated the impact of parents' working schedules on the time that they get to spend with their children, finding a negative and significant effect on parental time. In some research works I also found that the lack of parental time due to labor engagements could mean that children perform better at school, perhaps because income increases. For instance, Ochsen (2008) studied how parental labor activities affect children's education achievements. The results indicate that full-time working fathers and part-time working mothers have a significant positive effect on children education. The author also shows that children achieve less education level if parents are less successful in the labor market. Felfe and Hsin (2012) studied whether there is a link between maternal work conditions and children development. Their results show that the educational and social time that a mother provides to the child positively correlates with the child's development. However, there is a negative correlation with maternal time investments if the mother works.

In general, results reported in Table 4 indicate that parental total time is determined by child and family characteristics, while parental quality time is determined by family characteristics only. The age of the parents has very little and insignificant effect on both total and quality time.

The next chapter introduces the outcome and explanatory variables into empirical strategies in order to make a regression analysis and find causal interpretations that help to explain why both parental total time and parental quality time are affected, depending on the birth order differences when some factor such as (un)observed child and family characteristics control the models.

4 Empirical strategies and results

In this chapter, I use economic theory and statistical methods to learn about the Norwegian population, analyzing the data collected by Statistics Norway in 2010.

I use the multiple regression method for estimating the effects of birth order on parental total time and parental quality time. I can observe how much of the estimated effects of birth order on parental total time and parental quality time can be accredited to observable child and family characteristics.

The data also allows me to explore within-family fixed effects. Hence, I use a fixed effect approach for both total time and quality time. Thus, I can determine the sensibility of the birth order coefficients and look for an explanation of what causes the differences in parental time within a family.

4.1 Regression models

I estimate the average relationship between birth order, child characteristics, family characteristics and parental time with the following regression:

$$Parental\ time_i = \beta_k(birth\_order_{ik}) + \beta_2(X_i) + \beta_3(Z_i) + u_k \quad (1)$$

where $Parental\ time_i$ can be either the (logarithm) of total time and of quality time, respectively, that a parent spends with a child i during two days period. The independent variable $birth\_order_{ik}$ indicates the position that a child i was born within a family. The omitted indicator is the first-born child in this categorical variable. X_i is a set of variables that controls for child characteristics, i.e., child's gender and age, while Z_i is a set of variables that controls for family characteristics that includes family size, parent's gender, age, civil status, and labor status.

The effect of interest is β_k that measures the effect on parental time while holding child and family characteristics constants.

Table 4 in previous section reports the child's age to be a significant factor that affects both parental total and quality time, thus, controlling by child's age we can observe how this child characteristic can influence the birth order coefficient (β_k).

One concern with specification (1) is that there are family level inputs that are unobserved but that correlate with birth order coefficients after conditioning on X and Z.

Because I observe inputs for all children I can control for all unobserved family characteristics that are the same for children from the same family through a family fixed effect.

This fixed effect model takes the following form:

$$Parental\ time_{fk} = \alpha_f + \beta_k(birth\_order_{ik}) + \beta(X_{fk}) + u_{fk} \quad (2)$$

where the outcome variable, parental time, is represented by $\ln\_Ttime$ and $\ln\_Qtime$ for family f and child birth order position k. The family-specific effects, α, to be estimated, captures the effects that differ from one family to the next but do not change among children within a family. The variable X is a vector of explanatory variables and u is the error term specific to each birth order position in family f.

4.2 Birth order effects on parental time

Table 5 shows several specifications with the results for multiple regression and fixed effect models for both parental total time and parental quality time.

The first two columns of each outcome variable report the regressions for multiple regression model. Column [1] and [4] presents the regression of birth order effects on parental total time and parental quality time, respectively controlling for family size and child's age. Column [2] and [5] presents alternative regressions that control for additional family characteristics. Columns [3] and [6] present specifications for the family-fixed effects model.

The coefficients of family size are insignificant in all OLS regressions after controlling for child and family characteristics. Similar results were found in the literature when they observe family size effects on children outcomes. For example, Hanushek (1992) concluded that birth order position within smaller families have insignificant effect on performance. The findings also show that there is an advantage to be last-born in large families, because last-born children do not have younger siblings to compete with for maternal time.

Table 5. OLS and FE estimators for parental total time and quality time per child

dependent variable:

	ln_Ttime			ln_Qtime		
Regressor	**[1]**	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**
Birth order						
1	(base)	(base)	(base)	(base)	(base)	(base)
2	-0,08 ***	-0,07 **	-0,10 **	-0,15 ***	-0,14 ***	-0,05
	[0,03]	[0,03]	[0,04]	[0,03]	[0,03]	[0,04]
3	-0,11 *	-0,10 *	-0,14	-0,24 ***	-0,23 ***	-0,03
	[0,05]	[0,06]	[0,09]	[0,06]	[0,06]	[0,08]
Family size						
1	(base)	(base)	-	(base)	(base)	-
2	0,01	0,03	-	0,06	0,07	-
	[0,05]	[0,05]	-	[0,06]	[0,06]	-
3	-0,09	-0,06	-	0,02	0,03	-
	[0,07]	[0,07]	-	[0,08]	[0,08]	-
Child's gender						
Boy		(base)	(base)		(base)	(base)
Girl		0,07 **	-0,01		-0,01	0,02
		[0,03]	[0,03]		[0,04]	[0,03]
Parent's gender						
Father		(base)	-		(base)	-
Mother		0,23 ***	-		0,09 *	-
		[0,05]	-		[0,05]	-
Higher education		0,08			-0,00	
		[0,07]			[0,07]	
Married		-0,07	-		-0,05	-
		[0,05]	-		[0,05]	-
Work		-0,30 ***	-		-0,23 ***	-
		[0,06]			[0,08]	-
constant	6,62 ***	6,41 ***	6,61 ***	4,85 ***	4,95 ***	4,68 ***
	[0,09]	[0,14]	[0,15]	[0,11]	[0,17]	[0,16]
N	1757	1756	1756	1712	1711	1711

These regressions were estimated using data from Time Use in Norway 2010. Robust standard errors are given in parenthesis under coefficients. The individual coefficient is statistically significant at the (***) 1% level, (**) 5% level or at (*) 10% level using a two-sided test.

Figure 2 illustrates the effects of the child's age on parental time.[2] The size of the sample is 1756 and 1711 observations for parental total time and parental quality time, respectively. The curves show a negative linear tendency. This means that both parental total time and parental quality time decreases as children age. This last observation agrees with the results reported by Price (2008). He found that the amount of parent quality time decreases as children get older.

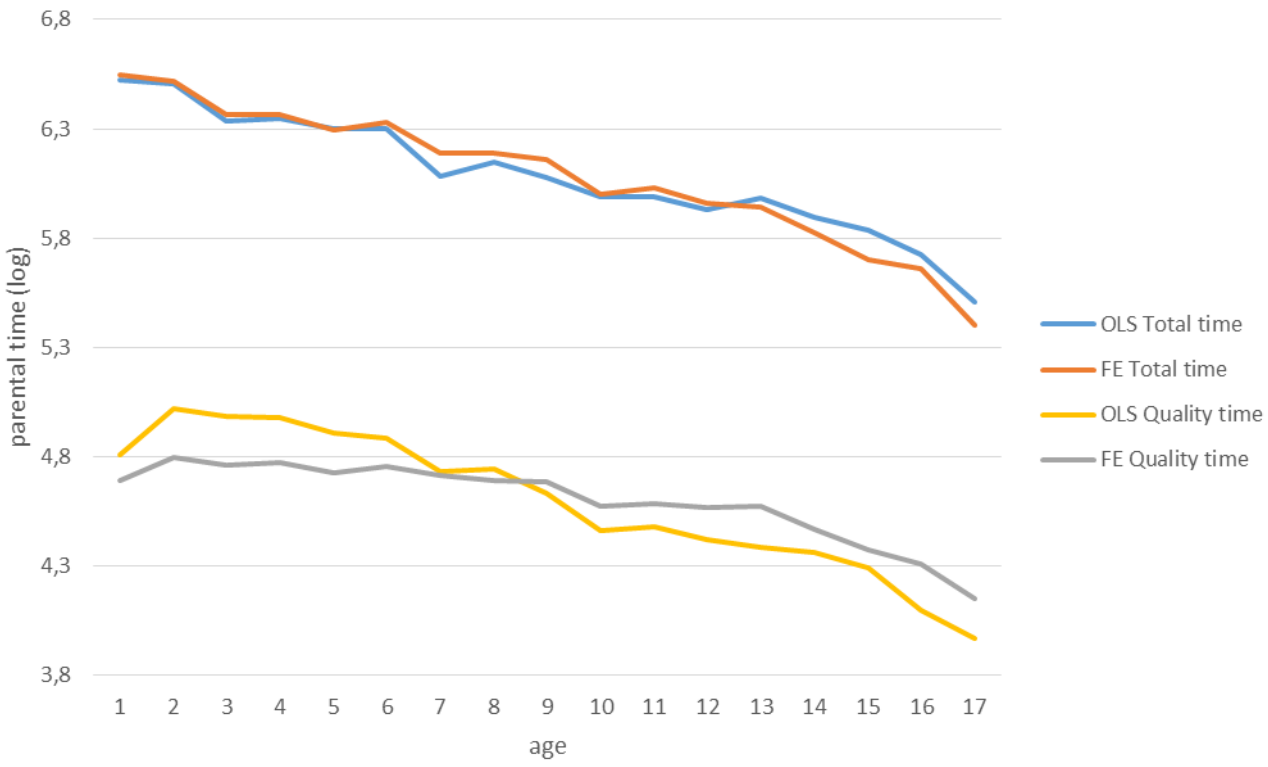

Figure 2. Child's age effects on parental total time and parental quality time

In figure 2, upper curves correspond to parental total time. They show that older children receive less total time in comparison with the youngest child. The OLS and FE estimator for children over two years old are statistically significant different from zero at 10%, 5% and 1% of significance level. This means that children over two years old affects the total time that parents provide to their children.

The lower curves, for parental quality time, reflects for that younger children (less than 6 for OLS and less than 8 for FE) receive slightly more quality time in comparison with the youngest child. The coefficients for these younger children are statistically insignificant at 5%

[2] The OLS and FE regressions for total and quality time with the coefficients for child's age are shown in annex C.

level. Older children (more than 7 for OLS and more than 9 for FE) receive less quality time from a parent. The coefficients for OLS estimators are statistically significant different from zero at 5% and 10% for children aged between 10 and 17 years. FE coefficients are statistically significant at 5% and 1% for children aged 16 and 17 years, respectively.

This leads to the conclusion that children over 9 years old affect the quality time that parents give to their children. Within families, children over 15 years old only affect parental quality time.

Birth order effects

In table 5 when controlling for additional family characteristics in column [2], the results suggest that the effect of birth order decrease for both second-born and third-born children.

The hypothesis that the coefficient of a married parent is zero cannot be rejected. Therefore, a married parent has negligible effect on the estimated coefficient of birth order. Girls, mothers and working parents, directly contribute in the variation of the coefficients of birth order for second-born children. The level of significance of those coefficients varies from 1% to 5%. Meanwhile the coefficients for third-born children remain statistically significant at 10% level. According to the report "Tidene skifter, tidsbruk 1971-2010", 2012 by Statistics Norway, mothers spend most of the time with the children compared to the fathers, confirming the results obtained in this study.

A comparison between multi regression and fixed effect models shows that the coefficients of birth order are not sensitive for second-born child and remain statistically significant at 5% level. However, the coefficients of birth order for third-born children lose significance.

When controlling for child's gender, girls and boys within a family receive approximately the same parental total time. The null hypothesis cannot be rejected at 10% level.

In conclusion, birth order has negative and significant effects on parental total time for second-born children in both models, and significant effects for third-born children for the first model.

The multi regression specification in column [5], OLS estimators for parental quality time do not report sensitivity in any of the coefficients of birth order when controlling for child and

family characteristics. The coefficients are estimated to be significantly different from zero at a 1% significance level.

The coefficients of child's gender and a married parent are estimated to be small and insignificantly different from zero at 10% of significance level. Thus, they do not contribute significantly to the effect of parental quality time.

Mothers and working parents have a direct contribution towards parental quality time. The mother has a positive and significant effect. The null hypothesis can be rejected at 10% level. Previous studies, Monfardini and See (2012); Cardona (2012); Schoppe-Sullivan et al (2013) show that birth order affects the time that a parents invest in their children, especially maternal time. Additionally, a working parent has a negative and significant effect at 1% level.

The family-fixed effects model in column [6] report that birth order coefficients have negligible effects on parental quality time. In this model, the child's gender also has a small and insignificant effect.

When comparing both models, the coefficients of birth order increases considerably, losing significance at 10% level. This means that parents within a family allocate quality time equally among children. It is important to mention that in previous research, Hertwig et al. (2002) concluded that parents create a differential on children's outcomes when they try to allocate the same time resources between children. This is because first-born children benefit from time alone with the parents until the second child is born.

As general result, birth order significantly affects parental quality time for multi regression models. Conversely, within families, birth order has negligible effects on parental quality time. In this last model, family specific effect explains about 84% of the variation of the model.

Fixed effect model addresses omitted variable bias that arise from unobserved variables. However, possible sources of omitted variables bias can threaten the validity of the model. Potential extensions to this work are commented on in the next section.

Some research found a link between birth order and working mothers. For example, Bryant and Zick (1996) studied parent-child time in a number of household activities. Their results

show that full-time working mothers provide less childcare time to the older child than mothers who work less. Therefore, I include interaction terms in the OLS regressions to evaluate whether the presence of mothers, girls and working parents interact with birth order such that the effect on parental time of an increase in birth order depends on parent's gender, child's gender and parent's labor status. The regressions in table 6 and table 7 are controlled by family size and child's age.[3] The first column is the base specification without interaction terms. Birth order coefficients are sensitive to the inclusion of interaction terms.

Regressions in table 6 report the results for parental total time.

Table 6. OLS regressions with interaction terms for parental total time

dependent variable:	ln_Ttime			
Regressor	**[1]**	**[2]**	**[3]**	**[4]**
Birth order	-0,06 **	-0,10 ***	-0,02	-0,07 **
	[0,02]	[0,04]	[0,05]	[0,03]
Mother	0,22 ***	0,10	0,22 ***	0,22 ***
	[0,05]	[0,08]	[0,05]	[0,05]
*Birth order*mother*		0,08 *		
		[0,05]		
Family size				
1	(base)	(base)	(base)	(base)
2	0,01	0,02	0,02	0,02
	[0,05]	[0,05]	[0,05]	[0,05]
3	-0,07	-0,07	-0,07	-0,07
	[0,07]	[0,07]	[0,07]	[0,07]
Work	-0,30 ***	-0,30 ***	-0,23 ***	-0,30 ***
	[0,06]	[0,06]	[0,09]	[0,06]
*Birth order*work*			-0,05	
			[0,05]	
Girl	0,07 **	0,06 *	0,07 **	0,03
	[0,03]	[0,03]	[0,03]	[0,09]
*Birth order*girl*				0,02
				[0,05]
constant	6,51 ***	6,84 ***	6,71 ***	6,79 ***
	[0,13]	[0,11]	[0,13]	[0,11]
N	1756	1757	1757	1757

These regressions were estimated using data from Time Use in Norway 2010. Robust standard errors are given in parenthesis under coefficients. The individual coefficient is statistically significant at the (***) 1% level, (**) 5% level or at (*) 10% level using a two-sided test.

[3] The OLS regressions for total and quality time with the coefficients for child's age are shown in annexes D and E..

The second column in table 6 shows that an increase in birth order position reduces the total time a father spends on his child with 10%. The null hypothesis that the effect of birth order is the same for fathers and mothers can be rejected at 10% of significance level. More specifically, there appear to be no birth order effects concerning total time when it comes to mothers: the effects is minus 2% and is not statistically significant at conventional levels.

The third column investigates whether birth order effects are different between working and non-working parents. Although the estimated birth gradient is negative and steeper for working parents, the null hypothesis that the effect of birth order is the same for working and non-working parents cannot be rejected at the 10% level.

The fourth column shows whether the effect of birth order is different for boys and girls. The coefficient for the interaction term is insignificant at the 10% level, and parental total time is reduced significantly by 7% regardless the gender of the child.

Table 7 reports the same analysis but now for parental quality time. The birth order grades is steeper than for total time, but again I find that it is attenuated for mothers. The difference in the effect of an increase in birth order position between fathers and mothers is 8% in the second column, and statistically significant at 10% level.

The third column shows that the effect of birth order position is more negative for children with working parents, and the difference is significant at the 10% level. Finally, in the last column, we cannot reject that the effect of birth order is the same for girls and boys, although the gradient is again steeper for boys than for girls.

To summarize, the effect on birth order depends on the parent's gender and is more pronounced for fathers than for mothers. While quality time of mothers reduce with birth order, there is in fact no birth order effect when it comes to total maternal time. Parental input also appear to depend on whether parent’s work or not, in particular when it comes to quality time. Finally, there is little evidence that birth order effects are different for children of different gender.

Table 7. OLS regressions with interaction terms for parental quality time

dependent variable:

	ln_Qtime			
Regressor	**[1]**	**[2]**	**[3]**	**[4]**
Birth order	-0,13 ***	-0,17 ***	-0,02	-0,15 ***
	[0,02]	[0,04]	[0,07]	[0,04]
Mother	0,10 *	-0,04	0,09 *	0,09 *
	[0,05]	[0,08]	[0,05]	[0,05]
*Birth order*mother*		0,09 *		
		[0,05]		
Family size				
1	(base)	(base)	(base)	(base)
2	0,09 *	0,06	0,06	0,06
	[0,05]	[0,06]	[0,06]	[0,06]
3	0,06	0,03	0,03	0,03
	[0,08]	[0,08]	[0,08]	[0,08]
Work	-0,23 ***	-0,24 ***	-0,06	-0,24 ***
	[0,08]	[0,08]	[0,12]	[0,08]
*Birth order*work*			-0,12 *	
			[0,07]	
Girl	-0,01	-0,01	0,00	-0,06
	[0,04]	[0,04]	[0,04]	[0,09]
*Birth order*girl*				0,04
				[0,06]
constant	5,39 ***	5,20 ***	4,97 ***	5,17 ***
	[0,15]	[0,15]	[0,17]	[0,15]
N	1711	1712	1712	1712

These regressions were estimated using data from Time Use in Norway 2010. Robust standard errors are given in parenthesis under coefficients. The individual coefficient is statistically significant at the (***) 1% level, (**) 5% level or at (*) 10% level using a two-sided test.

4.3 Potential extensions

Siblings' characteristics can make the parents treat children differently. For instance, birth spacing and special children could be factors that influence the way that the parents allocate time resources to their children. These factors could cause the parents to alter the birth order rank, or treat the child as he / she were younger. If so, then these different treatments from parents to children can affect the observed birth order effects.

Birth spacing

The data used in the regression analysis contain observations where two consecutive children are spaced more than 5 years apart. Large gaps between births make the birth order positions suffer alterations. For instance, a second-born child can be considered as a first-born child instead, if his / her sibling has five or more years apart. As a result, a younger child could benefit from this new birth order rank. Thus, the coefficients for birth order in the specifications can be biased because they do not show the real birth order position. To address this issue, the data needs to be adjusted. It is necessary to identify the siblings with more than five years apart, separate them into new groups of siblings into the same family, and recalculate the new birth order positions and new family size as they hypothetically pertain to another family with the same family characteristics. This issue could be a motivation for future work to explore whether the coefficients of birth order suffer significant variation and to confirm the results obtained by Zajonc and Markus (1975). They found that large and short birth spaces benefit and detriment younger children, respectively.

Child with special needs

The coefficients of birth order can also contains bias if the sample has children with physical or mental difficulties. These children need more attention from their parents. Consequently, the birth order position could be altered, as was the case of birth space. Because parents treat a child with special needs as if he / she were a first-born child or a younger child, the coefficients for birth order and child age can be different. Addressing this issue is more challenging because we need to include the data that contains this information.

Skilled children

Some younger children are more skilled than older children. Some job researches, such as, Cardona and Diewall (2014) have found that parents behave differently, investing more time and resources in the more skilled child. In this way, the variables birth order and children age group can contain information of these skilled children. If this is the case, the coefficients of birth order can be altered.

Twins

Some children benefit from parental time when they are considered as special children. That is the case of twin or multiple births. These children can obtain more attention from their parents as in the case of children with special needs or physical problems. In the sample data each child is provided with a birth rank, regardless of whether they were born alone or not. The coefficients of birth order effects can be biased if there is substantial amount of twins in the sample data and the real birth rank of these children is different from the one assigned for the regression analysis.

5 Conclusions

In this thesis, I examined the effect of birth order differences on parental time. The selection of activities that represent parental quality time are based in the parent-child interaction, where the child is the focus of attention.

Using data from the Norwegian Time Use Survey, 2010, results show that, family size has positive and large correlation with birth order and child's age has negative and large influence over the birth order coefficients that explains the total time and the quality time that parents spend with a child.

Previous studies have found that the amount of quality time that parents provide to their children decreases as children age (Price, 2008). This work also observes the same result for both parental total time and parental quality time. It was found that the negative relationship between parental time and child's age is linear, i.e., parents reduce nearly proportionally the amount of time allocated to their children as the children age.

Girls receive more total time compared with the parental total time that boys receive. However, both girls and boys receive approximately the same quality time.

Maternal time is a positive and significant factor that affects the total and quality time that children receive. Married parents affect negatively the parental total time that a child receives, while a married parent has small and insignificant effects on parental quality time. Furthermore, working parents reduce significantly parental time, having larger effect on parental quality time than total time.

Results show that first-born children receive more total time and quality time from their parents compared with children in higher birth order positions. When controlling for family and child effects, birth order differences have a large effect on both parental total time and parental quality time. Within family fixed effects, second-born children affects the total time that parents allocate to children. However, birth order has a negligible effect on parental quality time.

Within families, results indicate that parents try to allocate the same amount of time resource among siblings, perhaps because Norwegian culture is based on equality. Results conducted by Hertwig et al. (2002) point out that when parents subdivide time evenly between children,

different outcomes among siblings are to be expected. Thus, an extension of this thesis is recommended to confirm Hertwig's results in order to contribute with a final model that helps to explain why birth order differences are linked with children outcomes.

Birth order depends on whether parent's gender is a father or mother for both total time and quality time. Nevertheless, birth order is not affected regardless child's gender. Only parental quality time is affected by parent's labor status for an increase in the birth order position.

Finally, it is necessary to highlight that potential source of omitted variable bias lead to threats against the validity of the models. Some factors such as siblings characteristics, i.e, birth spacing, special or skilled children, may influence the way that parents allocate time resources to their children. This means that these issues can influence the birth order differences. Therefore, an extension of this work may be done to include this omitted information.

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Annex

A.

ACTIVITIES SELECTED AS QUALITY TIME IN A PARENT-CHILD RELATIONSHIP

Household work

Caring for own children

242 Help with homework
243 Play with kids
244 Conversations with children
245 Reading aloud to children

Personal needs

Meals

420 Meals

Leisure

Sports and Outdoors

510 Unspecified sports and outdoors
511 Jogging and running
512 Play Ball
513 Aerobics and gymnastics
514 bodybuilding and fitness training
515 Skiing
516 Other skiing and tobogganing activities
517 Ice skating
518 Hiking in the woods
519 Berry and mushroom walks in the woods
520 Walks
521 Bicycle Tours
522 Swimming and sunbathing
523 Other sports, exercise and fitness
524 Boat
525 Fishing trips
526 Hunting
527 Other tours and outdoor activities
528 Personal care in conjunction with sports and outdoors
529 Activities in connection with sport and outdoors

B.

STATA CODE FOR PREPARING DATA FOR REGRESSION ANALYSIS

```
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2 use "M:\pc\Dokumenter\SMMM\raw\0000 - Tidsbruksundersøkelsen, 2010, dagbokfil.dta"
3
4 *---SELECTING VARIABLES:
5 keep v0002 v0005 v0010 v0015 v0270 v0279 v0597-v0601 v0606 v0608 v0611-v0615 v0622 v0624
v0627-v0631 v0638 v0640 v0643-v0647 v0654 v0656 v0659-v0663 v0670 v0672 v0675-v0679 v0686
v0688 v0691-v0695 v0702 v0704 v0707-v0711 v0718 v0720 v0723-v0727 v0734 v0736 v0739-v0743
v0750 v0752 v0755-v0759 v0766 v0768 v0771-v0775 v0782 v0784 v0787-v0791 v0798 v0800 v0803-
v0807 v0814 v0816 v0819-v0823 v0830 v0832 v0835-v0839 v0846 v0848 v0851-v0855 v0862 v0864
v0867-v0871 v0878 v0880 v0883-v0887 v0894 v0896 v0899 -v0903 v0910 v0912 v0915-v0919 v0926
v0928 v0931-v0935 v0942 v0944 v0947-v0951 v0958 v0960 v0963-v0967 v0974 v0976 v0979-v0983
v0990 v0992 v0995-v0999 v1006 v1008 v1011-v1015 v1022 v1024 v1027-v1031 v1038 v1040 v1043-
v1047 v1054 v1056 v1059-v1063 v1070 v1072 v1075-v1079 v1086 v1088 v1091-v1095 v1102 v1104
v1107-v1111 v1118 v1120 v1123-v1127 v1134 v1136 v1139-v1143 v1150 v1152 v1155-v1159 v1166
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v1287 v1294 v1296 v1299-v1303 v1310 v1312 v1315-v1319 v1326 v1328 v1331-v1335 v1342 v1344
v1347-v1351 v1358 v1360 v1363-v1367 v1374 v1376 v1379-v1383 v1390 v1392 v1395-v1399 v1406
v1408 v1411-v1415 v1422 v1424 v1427-v1431 v1438 v1440 v1443-v1447 v1454 v1456 v1459-v1463
v1470 v1472 v1475-v1479 v1486 v1488 v1491-v1495 v1502 v1504 v1507-v1511 v1518 v1520 v1523-
v1527 v1534 v1536 v1539-v1543 v1550 v1552 v1555-v1559 v1566 v1568 v1571-v1575 v1582 v1584
v1587-v1591 v1598 v1600 v1603-v1607 v1614 v1616 v1619-v1623 v1630 v1632 v1635-v1639 v1646
v1648 v1651-v1655 v1662 v1664 v1667-v1671 v1678 v1680 v1683-v1687 v1694 v1696 v1699-v1703
v1710 v1712 v1715-v1719 v1726 v1728 v1731-v1735 v1742 v1744 v1747-v1751 v1758 v1760 v1763-
v1767 v1774 v1776 v1779-v1783 v1790 v1792 v1795-v1799 v1806 v1808 v1811-v1815 v1822 v1824
v1827-v1831 v1838 v1840 v1843-v1847 v1854 v1856 v1859-v1863 v1870 v1872 v1875-v1879 v1886
v1888 v1891-v1895 v1902 v1904 v1907-v1911 v1918 v1920 v1923-v1927 v1934 v1936 v1939-v1943
v1950 v1952 v1955-v1959 v1966 v1968 v1971-v1975 v1982 v1984 v1987-v1991 v1998 v2000 v2003-
v2007 v2014 v2016 v2019-v2023 v2030 v2032 v2035-v2039 v2046 v2048 v2051-v2055 v2062 v2064
v2067-v2071 v2078 v2080 v2083-v2087 v2094 v2096 v2099-v2103 v2110 v2112 v2115-v2119 v2126
v2128 v2131-v2135 v2142 v2144 v2147-v2151 v2158 v2160 v2163-v2167 v2174 v2176 v2179-v2183
v2190 v2192 v2195-v2199 v2206 v2208 v2211-v2215 v2222 v2224 v2227-v2231 v2238 v2240 v2243-
v2247 v2254 v2256 v2259-v2263 v2270 v2272 v2275-v2279 v2286 v2288 v2291-v2295 v2302 v2304
v2307-v2311 v2318 v2320 v2323-v2327 v2334 v2336 v2339-v2343 v2350 v2352 v2355-v2359 v2366
v2368 v2371-v2375 v2382 v2384 v2387-v2391 v2398 v2400 v2403-v2407 v2414 v2416 v2419-v2423
v2430 v2432 v2435-v2439 v2446 v2448 v2451-v2455 v2462 v2464 v2467-v2471 v2478 v2480 v2483-
v2487 v2494 v2496 v2499-v2503 v2510 v2512 v2515-v2519 v2526 v2528 v2531-v2535 v2542 v2544
v2547-v2551 v2558 v2560 v2563-v2567 v2574 v2576 v2579-v2583 v2590 v2592 v2595-v2599 v2606
v2608 v2611-v2615 v2622 v2624 v2627-v2631 v2638 v2640 v2643-v2647 v2654 v2656 v2659-v2663
v2670 v2672 v2675-v2679 v2686 v2688 v2691-v2695 v2702 v2704 v2707-v2711 v2718 v2720 v2723-
v2727 v2734 v2736 v2739-v2743 v2750 v2752 v2755-v2759 v2766 v2768 v2771-v2775 v2782 v2784
v2787-v2791 v2798 v2800 v2803-v2807 v2814 v2816 v2819-v2823 v2830 v2832 v2835-v2839 v2846
v2848 v2851-v2855 v2862 v2864 v2867-v2871 v2878 v2880 v2883-v2887 v2894 v2896 v2899-v2903
v2945-v2949 v2950-v2954 v3086-v3090
6
7 *---RENAMING SELECTED VARIABLES:
8 rename (v0002 v0005 v0010 v0015) (parent_gender parent_age civil_status hh_members)
9 rename (v0270 v0279) (labor_status educ_lev)
10 rename (v0597 v0598 v0599 v0600 v0601) (M1 M2 M3 M4 M5)
11 *registered members for activities (2 digits of year of birth)
12
13 rename (v0606 v0608 v0611 v0612 v0613 v0614 v0615) (a1 b1 c1 d1 e1 f1 g1)
14 rename (v0622 v0624 v0627 v0628 v0629 v0630 v0631) (a2 b2 c2 d2 e2 f2 g2)
15 rename (v0638 v0640 v0643 v0644 v0645 v0646 v0647) (a3 b3 c3 d3 e3 f3 g3)
```

16 rename (v0654 v0656 v0659 v0660 v0661 v0662 v0663) (a4 b4 c4 d4 e4 f4 g4)
17 rename (v0670 v0672 v0675 v0676 v0677 v0678 v0679) (a5 b5 c5 d5 e5 f5 g5)
18 rename (v0686 v0688 v0691 v0692 v0693 v0694 v0695) (a6 b6 c6 d6 e6 f6 g6)
19 rename (v0702 v0704 v0707 v0708 v0709 v0710 v0711) (a7 b7 c7 d7 e7 f7 g7)
20 rename (v0718 v0720 v0723 v0724 v0725 v0726 v0727) (a8 b8 c8 d8 e8 f8 g8)
21 rename (v0734 v0736 v0739 v0740 v0741 v0742 v0743) (a9 b9 c9 d9 e9 f9 g9)
22 rename (v0750 v0752 v0755 v0756 v0757 v0758 v0759) (a10 b10 c10 d10 e10 f10 g10)
23 rename (v0766 v0768 v0771 v0772 v0773 v0774 v0775) (a11 b11 c11 d11 e11 f11 g11)
24 rename (v0782 v0784 v0787 v0788 v0789 v0790 v0791) (a12 b12 c12 d12 e12 f12 g12)
25 rename (v0798 v0800 v0803 v0804 v0805 v0806 v0807) (a13 b13 c13 d13 e13 f13 g13)
26 rename (v0814 v0816 v0819 v0820 v0821 v0822 v0823) (a14 b14 c14 d14 e14 f14 g14)
27 rename (v0830 v0832 v0835 v0836 v0837 v0838 v0839) (a15 b15 c15 d15 e15 f15 g15)
28 rename (v0846 v0848 v0851 v0852 v0853 v0854 v0855) (a16 b16 c16 d16 e16 f16 g16)
29 rename (v0862 v0864 v0867 v0868 v0869 v0870 v0871) (a17 b17 c17 d17 e17 f17 g17)
30 rename (v0878 v0880 v0883 v0884 v0885 v0886 v0887) (a18 b18 c18 d18 e18 f18 g18)
31 rename (v0894 v0896 v0899 v0900 v0901 v0902 v0903) (a19 b19 c19 d19 e19 f19 g19)
32 rename (v0910 v0912 v0915 v0916 v0917 v0918 v0919) (a20 b20 c20 d20 e20 f20 g20)
33 rename (v0926 v0928 v0931 v0932 v0933 v0934 v0935) (a21 b21 c21 d21 e21 f21 g21)
34 rename (v0942 v0944 v0947 v0948 v0949 v0950 v0951) (a22 b22 c22 d22 e22 f22 g22)
35 rename (v0958 v0960 v0963 v0964 v0965 v0966 v0967) (a23 b23 c23 d23 e23 f23 g23)
36 rename (v0974 v0976 v0979 v0980 v0981 v0982 v0983) (a24 b24 c24 d24 e24 f24 g24)
37 rename (v0990 v0992 v0995 v0996 v0997 v0998 v0999) (a25 b25 c25 d25 e25 f25 g25)
38 rename (v1006 v1008 v1011 v1012 v1013 v1014 v1015) (a26 b26 c26 d26 e26 f26 g26)
39 rename (v1022 v1024 v1027 v1028 v1029 v1030 v1031) (a27 b27 c27 d27 e27 f27 g27)
40 rename (v1038 v1040 v1043 v1044 v1045 v1046 v1047) (a28 b28 c28 d28 e28 f28 g28)
41 rename (v1054 v1056 v1059 v1060 v1061 v1062 v1063) (a29 b29 c29 d29 e29 f29 g29)
42 rename (v1070 v1072 v1075 v1076 v1077 v1078 v1079) (a30 b30 c30 d30 e30 f30 g30)
43 rename (v1086 v1088 v1091 v1092 v1093 v1094 v1095) (a31 b31 c31 d31 e31 f31 g31)
44 rename (v1102 v1104 v1107 v1108 v1109 v1110 v1111) (a32 b32 c32 d32 e32 f32 g32)
45 rename (v1118 v1120 v1123 v1124 v1125 v1126 v1127) (a33 b33 c33 d33 e33 f33 g33)
46 rename (v1134 v1136 v1139 v1140 v1141 v1142 v1143) (a34 b34 c34 d34 e34 f34 g34)
47 rename (v1150 v1152 v1155 v1156 v1157 v1158 v1159) (a35 b35 c35 d35 e35 f35 g35)
48 rename (v1166 v1168 v1171 v1172 v1173 v1174 v1175) (a36 b36 c36 d36 e36 f36 g36)
49 rename (v1182 v1184 v1187 v1188 v1189 v1190 v1191) (a37 b37 c37 d37 e37 f37 g37)
50 rename (v1198 v1200 v1203 v1204 v1205 v1206 v1207) (a38 b38 c38 d38 e38 f38 g38)
51 rename (v1214 v1216 v1219 v1220 v1221 v1222 v1223) (a39 b39 c39 d39 e39 f39 g39)
52 rename (v1230 v1232 v1235 v1236 v1237 v1238 v1239) (a40 b40 c40 d40 e40 f40 g40)
53 rename (v1246 v1248 v1251 v1252 v1253 v1254 v1255) (a41 b41 c41 d41 e41 f41 g41)
54 rename (v1262 v1264 v1267 v1268 v1269 v1270 v1271) (a42 b42 c42 d42 e42 f42 g42)
55 rename (v1278 v1280 v1283 v1284 v1285 v1286 v1287) (a43 b43 c43 d43 e43 f43 g43)
56 rename (v1294 v1296 v1299 v1300 v1301 v1302 v1303) (a44 b44 c44 d44 e44 f44 g44)
57 rename (v1310 v1312 v1315 v1316 v1317 v1318 v1319) (a45 b45 c45 d45 e45 f45 g45)
58 rename (v1326 v1328 v1331 v1332 v1333 v1334 v1335) (a46 b46 c46 d46 e46 f46 g46)
59 rename (v1342 v1344 v1347 v1348 v1349 v1350 v1351) (a47 b47 c47 d47 e47 f47 g47)
60 rename (v1358 v1360 v1363 v1364 v1365 v1366 v1367) (a48 b48 c48 d48 e48 f48 g48)
61 rename (v1374 v1376 v1379 v1380 v1381 v1382 v1383) (a49 b49 c49 d49 e49 f49 g49)
62 rename (v1390 v1392 v1395 v1396 v1397 v1398 v1399) (a50 b50 c50 d50 e50 f50 g50)
63 rename (v1406 v1408 v1411 v1412 v1413 v1414 v1415) (a51 b51 c51 d51 e51 f51 g51)
64 rename (v1422 v1424 v1427 v1428 v1429 v1430 v1431) (a52 b52 c52 d52 e52 f52 g52)
65 rename (v1438 v1440 v1443 v1444 v1445 v1446 v1447) (a53 b53 c53 d53 e53 f53 g53)
66 rename (v1454 v1456 v1459 v1460 v1461 v1462 v1463) (a54 b54 c54 d54 e54 f54 g54)
67 rename (v1470 v1472 v1475 v1476 v1477 v1478 v1479) (a55 b55 c55 d55 e55 f55 g55)
68 rename (v1486 v1488 v1491 v1492 v1493 v1494 v1495) (a56 b56 c56 d56 e56 f56 g56)
69 rename (v1502 v1504 v1507 v1508 v1509 v1510 v1511) (a57 b57 c57 d57 e57 f57 g57)
70 rename (v1518 v1520 v1523 v1524 v1525 v1526 v1527) (a58 b58 c58 d58 e58 f58 g58)
71 rename (v1534 v1536 v1539 v1540 v1541 v1542 v1543) (a59 b59 c59 d59 e59 f59 g59)
72 rename (v1550 v1552 v1555 v1556 v1557 v1558 v1559) (a60 b60 c60 d60 e60 f60 g60)
73 rename (v1566 v1568 v1571 v1572 v1573 v1574 v1575) (a61 b61 c61 d61 e61 f61 g61)
74 rename (v1582 v1584 v1587 v1588 v1589 v1590 v1591) (a62 b62 c62 d62 e62 f62 g62)
75 rename (v1598 v1600 v1603 v1604 v1605 v1606 v1607) (a63 b63 c63 d63 e63 f63 g63)

76 rename (v1614 v1616 v1619 v1620 v1621 v1622 v1623) (a64 b64 c64 d64 e64 f64 g64)
77 rename (v1630 v1632 v1635 v1636 v1637 v1638 v1639) (a65 b65 c65 d65 e65 f65 g65)
78 rename (v1646 v1648 v1651 v1652 v1653 v1654 v1655) (a66 b66 c66 d66 e66 f66 g66)
79 rename (v1662 v1664 v1667 v1668 v1669 v1670 v1671) (a67 b67 c67 d67 e67 f67 g67)
80 rename (v1678 v1680 v1683 v1684 v1685 v1686 v1687) (a68 b68 c68 d68 e68 f68 g68)
81 rename (v1694 v1696 v1699 v1700 v1701 v1702 v1703) (a69 b69 c69 d69 e69 f69 g69)
82 rename (v1710 v1712 v1715 v1716 v1717 v1718 v1719) (a70 b70 c70 d70 e70 f70 g70)
83 rename (v1726 v1728 v1731 v1732 v1733 v1734 v1735) (a71 b71 c71 d71 e71 f71 g71)
84 rename (v1742 v1744 v1747 v1748 v1749 v1750 v1751) (a72 b72 c72 d72 e72 f72 g72)
85 rename (v1758 v1760 v1763 v1764 v1765 v1766 v1767) (a73 b73 c73 d73 e73 f73 g73)
86 rename (v1774 v1776 v1779 v1780 v1781 v1782 v1783) (a74 b74 c74 d74 e74 f74 g74)
87 rename (v1790 v1792 v1795 v1796 v1797 v1798 v1799) (a75 b75 c75 d75 e75 f75 g75)
88 rename (v1806 v1808 v1811 v1812 v1813 v1814 v1815) (a76 b76 c76 d76 e76 f76 g76)
89 rename (v1822 v1824 v1827 v1828 v1829 v1830 v1831) (a77 b77 c77 d77 e77 f77 g77)
90 rename (v1838 v1840 v1843 v1844 v1845 v1846 v1847) (a78 b78 c78 d78 e78 f78 g78)
91 rename (v1854 v1856 v1859 v1860 v1861 v1862 v1863) (a79 b79 c79 d79 e79 f79 g79)
92 rename (v1870 v1872 v1875 v1876 v1877 v1878 v1879) (a80 b80 c80 d80 e80 f80 g80)
93 rename (v1886 v1888 v1891 v1892 v1893 v1894 v1895) (a81 b81 c81 d81 e81 f81 g81)
94 rename (v1902 v1904 v1907 v1908 v1909 v1910 v1911) (a82 b82 c82 d82 e82 f82 g82)
95 rename (v1918 v1920 v1923 v1924 v1925 v1926 v1927) (a83 b83 c83 d83 e83 f83 g83)
96 rename (v1934 v1936 v1939 v1940 v1941 v1942 v1943) (a84 b84 c84 d84 e84 f84 g84)
97 rename (v1950 v1952 v1955 v1956 v1957 v1958 v1959) (a85 b85 c85 d85 e85 f85 g85)
98 rename (v1966 v1968 v1971 v1972 v1973 v1974 v1975) (a86 b86 c86 d86 e86 f86 g86)
99 rename (v1982 v1984 v1987 v1988 v1989 v1990 v1991) (a87 b87 c87 d87 e87 f87 g87)
100 rename (v1998 v2000 v2003 v2004 v2005 v2006 v2007) (a88 b88 c88 d88 e88 f88 g88)
101 rename (v2014 v2016 v2019 v2020 v2021 v2022 v2023) (a89 b89 c89 d89 e89 f89 g89)
102 rename (v2030 v2032 v2035 v2036 v2037 v2038 v2039) (a90 b90 c90 d90 e90 f90 g90)
103 rename (v2046 v2048 v2051 v2052 v2053 v2054 v2055) (a91 b91 c91 d91 e91 f91 g91)
104 rename (v2062 v2064 v2067 v2068 v2069 v2070 v2071) (a92 b92 c92 d92 e92 f92 g92)
105 rename (v2078 v2080 v2083 v2084 v2085 v2086 v2087) (a93 b93 c93 d93 e93 f93 g93)
106 rename (v2094 v2096 v2099 v2100 v2101 v2102 v2103) (a94 b94 c94 d94 e94 f94 g94)
107 rename (v2110 v2112 v2115 v2116 v2117 v2118 v2119) (a95 b95 c95 d95 e95 f95 g95)
108 rename (v2126 v2128 v2131 v2132 v2133 v2134 v2135) (a96 b96 c96 d96 e96 f96 g96)
109 rename (v2142 v2144 v2147 v2148 v2149 v2150 v2151) (a97 b97 c97 d97 e97 f97 g97)
110 rename (v2158 v2160 v2163 v2164 v2165 v2166 v2167) (a98 b98 c98 d98 e98 f98 g98)
111 rename (v2174 v2176 v2179 v2180 v2181 v2182 v2183) (a99 b99 c99 d99 e99 f99 g99)
112 rename (v2190 v2192 v2195 v2196 v2197 v2198 v2199) (a100 b100 c100 d100 e100 f100 g100)
113 rename (v2206 v2208 v2211 v2212 v2213 v2214 v2215) (a101 b101 c101 d101 e101 f101 g101)
114 rename (v2222 v2224 v2227 v2228 v2229 v2230 v2231) (a102 b102 c102 d102 e102 f102 g102)
115 rename (v2238 v2240 v2243 v2244 v2245 v2246 v2247) (a103 b103 c103 d103 e103 f103 g103)
116 rename (v2254 v2256 v2259 v2260 v2261 v2262 v2263) (a104 b104 c104 d104 e104 f104 g104)
117 rename (v2270 v2272 v2275 v2276 v2277 v2278 v2279) (a105 b105 c105 d105 e105 f105 g105)
118 rename (v2286 v2288 v2291 v2292 v2293 v2294 v2295) (a106 b106 c106 d106 e106 f106 g106)
119 rename (v2302 v2304 v2307 v2308 v2309 v2310 v2311) (a107 b107 c107 d107 e107 f107 g107)
120 rename (v2318 v2320 v2323 v2324 v2325 v2326 v2327) (a108 b108 c108 d108 e108 f108 g108)
121 rename (v2334 v2336 v2339 v2340 v2341 v2342 v2343) (a109 b109 c109 d109 e109 f109 g109)
122 rename (v2350 v2352 v2355 v2356 v2357 v2358 v2359) (a110 b110 c110 d110 e110 f110 g110)
123 rename (v2366 v2368 v2371 v2372 v2373 v2374 v2375) (a111 b111 c111 d111 e111 f111 g111)
124 rename (v2382 v2384 v2387 v2388 v2389 v2390 v2391) (a112 b112 c112 d112 e112 f112 g112)
125 rename (v2398 v2400 v2403 v2404 v2405 v2406 v2407) (a113 b113 c113 d113 e113 f113 g113)
126 rename (v2414 v2416 v2419 v2420 v2421 v2422 v2423) (a114 b114 c114 d114 e114 f114 g114)
127 rename (v2430 v2432 v2435 v2436 v2437 v2438 v2439) (a115 b115 c115 d115 e115 f115 g115)
128 rename (v2446 v2448 v2451 v2452 v2453 v2454 v2455) (a116 b116 c116 d116 e116 f116 g116)
129 rename (v2462 v2464 v2467 v2468 v2469 v2470 v2471) (a117 b117 c117 d117 e117 f117 g117)
130 rename (v2478 v2480 v2483 v2484 v2485 v2486 v2487) (a118 b118 c118 d118 e118 f118 g118)
131 rename (v2494 v2496 v2499 v2500 v2501 v2502 v2503) (a119 b119 c119 d119 e119 f119 g119)
132 rename (v2510 v2512 v2515 v2516 v2517 v2518 v2519) (a120 b120 c120 d120 e120 f120 g120)
133 rename (v2526 v2528 v2531 v2532 v2533 v2534 v2535) (a121 b121 c121 d121 e121 f121 g121)
134 rename (v2542 v2544 v2547 v2548 v2549 v2550 v2551) (a122 b122 c122 d122 e122 f122 g122)
135 rename (v2558 v2560 v2563 v2564 v2565 v2566 v2567) (a123 b123 c123 d123 e123 f123 g123)

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rename (v2574 v2576 v2579 v2580 v2581 v2582 v2583) (a124 b124 c124 d124 e124 f124 g124)
rename (v2590 v2592 v2595 v2596 v2597 v2598 v2599) (a125 b125 c125 d125 e125 f125 g125)
rename (v2606 v2608 v2611 v2612 v2613 v2614 v2615) (a126 b126 c126 d126 e126 f126 g126)
rename (v2622 v2624 v2627 v2628 v2629 v2630 v2631) (a127 b127 c127 d127 e127 f127 g127)
rename (v2638 v2640 v2643 v2644 v2645 v2646 v2647) (a128 b128 c128 d128 e128 f128 g128)
rename (v2654 v2656 v2659 v2660 v2661 v2662 v2663) (a129 b129 c129 d129 e129 f129 g129)
rename (v2670 v2672 v2675 v2676 v2677 v2678 v2679) (a130 b130 c130 d130 e130 f130 g130)
rename (v2686 v2688 v2691 v2692 v2693 v2694 v2695) (a131 b131 c131 d131 e131 f131 g131)
rename (v2702 v2704 v2707 v2708 v2709 v2710 v2711) (a132 b132 c132 d132 e132 f132 g132)
rename (v2718 v2720 v2723 v2724 v2725 v2726 v2727) (a133 b133 c133 d133 e133 f133 g133)
rename (v2734 v2736 v2739 v2740 v2741 v2742 v2743) (a134 b134 c134 d134 e134 f134 g134)
rename (v2750 v2752 v2755 v2756 v2757 v2758 v2759) (a135 b135 c135 d135 e135 f135 g135)
rename (v2766 v2768 v2771 v2772 v2773 v2774 v2775) (a136 b136 c136 d136 e136 f136 g136)
rename (v2782 v2784 v2787 v2788 v2789 v2790 v2791) (a137 b137 c137 d137 e137 f137 g137)
rename (v2798 v2800 v2803 v2804 v2805 v2806 v2807) (a138 b138 c138 d138 e138 f138 g138)
rename (v2814 v2816 v2819 v2820 v2821 v2822 v2823) (a139 b139 c139 d139 e139 f139 g139)
rename (v2830 v2832 v2835 v2836 v2837 v2838 v2839) (a140 b140 c140 d140 e140 f140 g140)
rename (v2846 v2848 v2851 v2852 v2853 v2854 v2855) (a141 b141 c141 d141 e141 f141 g141)
rename (v2862 v2864 v2867 v2868 v2869 v2870 v2871) (a142 b142 c142 d142 e142 f142 g142)
rename (v2878 v2880 v2883 v2884 v2885 v2886 v2887) (a143 b143 c143 d143 e143 f143 g143)
rename (v2894 v2896 v2899 v2900 v2901 v2902 v2903) (a144 b144 c144 d144 e144 f144 g144)
*activities (2 codes and 5 members)

rename (v2945 v2946 v2947 v2948 v2949) (N1 N2 N3 N4 N5)
*members' relationship with the respondent

rename (v2950 v2951 v2952 v2953 v2954) (O1 O2 O3 O4 O5)
*members' gender

*---GROUPING VARIABLES:
egen hh_inc = rowtotal(v3086-v3090)
*new income variable = sum up members' income

drop v3086-v3090

*---DESTRING VARIABLES:

destring educ_lev M* N* O*, replace
recode educ_lev (0/1999 = 1) (2000/2999 = 2) (3000/5999 = 3) (6000/8999 = 4) (9000/9999 = 5)
(miss = 1), gen(educ_level)
drop educ_lev

*---LABELING VARIABLES:
label variable parent_gender "Parent's gender"
label variable parent_age "Parent's age"
label variable civil_status "Parent's civil status"
label variable hh_members "Total numbers of members in the household"
label variable labor_status "Parent's labor status"
label variable educ_lev "Parent's education level"
label variable hh_inc "Household income"

label define parentgender 1 "Father" 2 "Mother"
label define v0010 1 "Married" 2 "Cohabitant" 3 "Divorced, widow(er), other", replace
label define v0270 1 "working" 2 "student" 3 "apprentice" 4 "unemployed" 5 "pensioner" 6
"AFP pensioner" 7 "pensioner i service" 8 "age pensioner" 9 "housekeeper" 10 "in militar
service" 11 "Other", replace
label define educlevel 1 "primary school" 2 "Junior school" 3 "High school" 4 "higher
education" 5 "not given"
label define relationship 2 "Spouse" 3 "Cohabitant" 4 "Son/Daughter" 5 "Stepchild" 6
"Sibling" 7 "Stepsibling" 8 "Parent" 9 "Steparent" 10 "Parent in law" 11 "Son/Daughter in
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law" 12 "Grandparent" 13 "Grandchild" 14 "Other relative" 15 "Other non-relative"
191 label define childgender 1 "Boy" 2 "Girl"
192
193 label values parent_gender parentgender
194 label values educ_level educlevel
195 label values N* relationship
196 label values O* childgender
197
198 *--CREATING ID's:
199 g id = _n
200 g id_fam = int((_n-1)/2)+1
201 egen id_obs = seq(), f(1) t(2)
202
203 *--RESHAPING:
204 reshape long a b c d e f g, i(id_fam id_obs) j(id_blck_10min)
205 rename (c d e f g) (m1 m2 m3 m4 m5)
206 reshape long m M N O, i(id_fam id_obs id_blck_10min) j(id_member)
207 *five members per activities
208
209 destring a b, replace
210
211 g code = a> 1 & b==.
212 g minutes = .
213 replace minutes = 10 if code == 1 & m == 1
214 replace minutes = 5 if code == 0 & m ==1
215
216 rename (a b) (act_code1 act_code2)
217 reshape long act_code, i(id_fam id_obs id_blck_10min id_member) j(id_act)
218
219 *--CREATING VARIABLES: (transforming year of birth to members' age)
220
221 g y_birth =.
222 replace y_birth = int(1900+M) if M>10 & M!=.
223 replace y_birth = int(2000+M) if M<=10 & M!=.
224 drop M
225
226 g m_age = int(2011-y_birth)
227
228 *--LABELING VARIABLES:
229 label variable act_code "activities"
230 label variable m "member present in activity"
231 label variable N "members's relationship with the respondent"
232 label variable O "member's gender"
233 label variable y_birth "member's year of birth"
234 label variable m_age "member's age"
235
236 *--COLLAPSING:
237 collapse (sum) minutes (first) parent_gender parent_age civil_status hh_members labor_status
N O hh_inc educ_level m_age if m ==1, by (id_fam id_member act_code)
238
239 *--CALCULATING TOTAL TIME:
240 drop if act_code==.
241 by id_fam id_member, sort: g TT = sum(minutes)
242 by id_fam id_member, sort: g Ttime = TT[_N]
243 drop TT
244
245 *--CALCULATING QUALITY TIME
246 recode act_code (242/245 420 510/529 = 1) (* = 0), gen(qualtime)
247 bysort id_fam id_member: g sumQT = sum(minutes * qualtime)
248 bysort id_fam id_member: g Qtime = sumQT[_N]
```

```
drop sumQT

*--LABELING VARIABLES:
rename (N O m_age) (m_rel child_gender child_age)

label variable Ttime "Cumulative parent-child Total time"
label variable Qtime "cumulative parent-child Quality time"
label values parent_gender parentgender
label values civil_status v0010
label values labor_status v0270
label values m_rel relationship
label values child_gender childgender
label values educ_level educlevel

*--KEEPING ONLY CHILDREN FROM 0 TO 17 YEARS OLD
keep if m_rel==4 | m_rel==5 | m_rel==11 // (keep only if members are: son/daughter,
stepchild, son/daughter in law)
keep if child_age<=17
keep if parent_age>17

*--COLLAPSING:
collapse (first) Ttime Qtime parent_gender parent_age civil_status hh_members labor_status
m_rel child_gender hh_inc educ_level, by (id_fam child_age)

*--LABELING VARIABLES:
label variable child_age "child's age"
label variable Ttime "cumulative parent-child Total time"
label variable Qtime "cumulative parent-child Quality time"
label variable parent_gender "parent's gender"
label variable parent_age "parent's age"
label variable civil_status "parent's civil status"
label variable hh_members "total members living in the house"
label variable labor_status "parent's labor status"
label variable m_rel "parent_child relationship"
label variable child_gender "child's gender"
label variable hh_inc "household income"
label variable educ_level "parent's education level"

label values parent_gender parentgender
label values civil_status v0010
label values labor_status v0270
label values m_rel relationship
label values child_gender childgender
label values educ_level educlevel

*--CREATING BIRTH ORDER VARIABLE:
gsort +id_fam -child_age
by id_fam: g birth_order = _n

*--CREATING FAMILY SIZE VARIABLE:
by id_fam, sort: g fsize = birth_order[_N]

*--CREATING BIRTH SPACE VARIABLE:
by id_fam, sort: g bspace = child_age[_n-1] - child_age

*--CREATING AGE GROUP VARIABLE
recode child_age (min/4=1)(5/8=2)(9/12=3)(13/16=4)(17/max=5), gen(age_group)
label define agegroup 1 "1-4" 2 "5-8" 3 "9-12" 4 "13-16" 5 "17"
label values age_group agegroup
label variable age_group "children age groups"
```

```
307
308 *--LOG DEPENDENT VARIABLE:
309 g ln_Ttime = ln(Ttime)
310 g ln_Qtime = ln(Qtime)
311
312 *--LABELING VARIABLES:
313 label variable birth_order "child birth order position"
314 label variable fsize "family size"
315 label variable bspace "birth space between siblings"
316 label variable ln_Ttime "log cumulative parent-child Total time"
317 label variable ln_Qtime "log cumulative parent-child Quality time"
318
319 *--CREATING A NEW ID FAMILY (CONTINUOS NUMBERS):
320 egen fam_id = group(id_fam)
321 drop id_fam
322
323 *--ORDERING DATA
324 order fam_id child_gender child_age birth_order bspace fsize parent_gender parent_age
civil_status educ_level labor_status hh_inc hh_members m_rel Ttime Qtime ln_Ttime ln_Qtime
325
326 *---SAVING DATA:
327 // saved in hard disk as 001.dta
```

C.

OLS AND FE REGRESSIONS FOR PARENTAL TOTAL TIME AND PARENTAL QUALITY TIME

dependent variable:

	ln_Ttime				ln_Qtime			
Regressor	OLS		FE		OLS		FE	
Child's age								
1	(base)		(base)		(base)		(base)	
2	-0,02		-0,03		0,21	*	0,10	
	[0,10]		[0,10]		[0,13]		[0,12]	
3	-0,19	*	-0,18	*	0,18		0,07	
	[0,10]		[0,10]		[0,11]		[0,12]	
4	-0,18	*	-0,18	*	0,17		0,08	
	[0,10]		[0,10]		[0,12]		[0,12]	
5	-0,22	**	-0,25	**	0,10		0,03	
	[0,10]		[0,11]		[0,13]		[0,13]	
6	-0,22	**	-0,22	**	0,08		0,06	
	[0,11]		[0,11]		[0,13]		[0,13]	
7	-0,44	***	-0,36	***	-0,08		0,03	
	[0,10]		[0,12]		[0,13]		[0,13]	
8	-0,38	***	-0,36	***	-0,07		-	
	[0,11]		[0,13]		[0,13]		[0,14]	
9	-0,45	***	-0,38	***	-0,18		-0,01	
	[0,10]		[0,13]		[0,14]		[0,14]	
10	-0,53	***	-0,55	***	-0,35	**	-0,11	
	[0,13]		[0,14]		[0,15]		[0,15]	
11	-0,54	***	-0,52	***	-0,33	**	-0,10	
	[0,12]		[0,15]		[0,13]		[0,15]	
12	-0,59	***	-0,59	***	-0,39	***	-0,12	
	[0,12]		[0,16]		[0,14]		[0,16]	
13	-0,54	***	-0,60	***	-0,43	***	-0,12	
	[0,11]		[0,18]		[0,14]		[0,17]	
14	-0,63	***	-0,72	***	-0,45	***	-0,22	
	[0,13]		[0,19]		[0,13]		[0,18]	
15	-0,68	***	-0,84	***	-0,52	***	-0,32	
	[0,11]		[0,20]		[0,14]		[0,20]	
16	-0,80	***	-0,89	***	-0,71	***	-0,38	*
	[0,13]		[0,24]		[0,15]		[0,22]	
17	-1,01	***	-1,14	***	-0,84	***	-0,54	**
	[0,12]		[0,23]		[0,13]		[0,21]	
constant	6,44	***	6,61	***	4,95	***	4,68	***
	[0,14]		[0,15]		[0,17]		[0,16]	
N	1756		1756		1711		1711	

These regressions were estimated using data from Time Use in Norway 2010. Robust standard errors are given in parenthesis under coefficients. The individual coefficient is statistically significant at the (***) 1% level, (**) 5% level or at (*) 10% level using a two-sided test.

D.

OLS REGRESSIONS WITH INTERACTION TERMS FOR PARENTAL TOTAL TIME

dependent variable:

		ln_Ttime					
Regressor		[2]		[3]		[4]	
Child's age							
	1	(base)		(base)		(base)	
	2	-0,03		-0,04		-0,04	
		[0,10]		[0,10]		[0,10]	
	3	-0,20	**	-0,20	**	-0,21	**
		[0,10]		[0,10]		[0,10]	
	4	-0,19	*	-0,19	*	-0,19	*
		[0,10]		[0,10]		[0,10]	
	5	-0,24	**	-0,24	**	-0,24	**
		[0,10]		[0,10]		[0,10]	
	6	-0,25	**	-0,25	**	-0,25	**
		[0,11]		[0,11]		[0,11]	
	7	-0,47	***	-0,47	***	-0,47	***
		[0,10]		[0,10]		[0,10]	
	8	-0,4	***	-0,40	***	-0,4	***
		[0,11]		[0,11]		[0,11]	
	9	-0,47	***	-0,47	***	-0,47	***
		[0,10]		[0,10]		[0,10]	
	10	-0,56	***	-0,56	***	-0,56	***
		[0,12]		[0,12]		[0,12]	
	11	-0,56	***	-0,56	***	-0,56	***
		[0,12]		[0,12]		[0,12]	
	12	-0,63	***	-0,63	***	-0,63	***
		[0,12]		[0,12]		[0,12]	
	13	-0,57	***	-0,57	***	-0,57	***
		[0,11]		[0,11]		[0,11]	
	14	-0,66	***	-0,66	***	-0,66	***
		[0,12]		[0,12]		[0,12]	
	15	-0,78	***	-0,72	***	-0,72	***
		[0,11]		[0,11]		[0,11]	
	16	-0,83	***	-0,83	***	-0,84	***
		[0,13]		[0,13]		[0,13]	
	17	-1,04	***	-1,04	***	-1,04	***
		[0,12]		[0,12]		[0,12]	
constant		6,84	***	6,71	***	6,79	***
		[0,11]		[0,13]		[0,11]	
N		1757		1757		1757	

These regressions were estimated using data from Time Use in Norway 2010. Robust standard errors are given in parenthesis under coefficients. The individual coefficient is statistically significant at the (***) 1% level, (**) 5% level or at (*) 10% level using a two-sided test.

E.

OLS REGRESSIONS WITH INTERACTION TERMS FOR PARENTAL QUALITY TIME

dependent variable:

	ln_Qtime		
Regressor	[2]	[3]	[4]
Child's age			
1	(base)	(base)	(base)
2	0,22 *	0,22 *	0,22 *
	[0,13]	[0,13]	[0,13]
3	0,19	0,19	0,19
	[0,12]	[0,12]	[0,12]
4	0,18	0,19	0,18
	[0,12]	[0,12]	[0,12]
5	0,11	0,11	0,1
	[0,12]	[0,13]	[0,13]
6	0,08	0,09	0,08
	[0,13]	[0,13]	[0,13]
7	-0,07	-0,07	-0,07
	[0,13]	[0,13]	[0,13]
8	-0,06	-0,06	-0,06
	[0,13]	[0,13]	[0,13]
9	-0,17	-0,17	-0,17
	[0,13]	[0,13]	[0,13]
10	-0,34 **	-0,35 **	-0,35 **
	[0,15]	[0,15]	[0,15]
11	-0,32 ***	-0,33 **	-0,33 **
	[0,13]	[0,13]	[0,13]
12	-0,39 ***	-0,39 ***	-0,39 ***
	[0,14]	[0,14]	[0,14]
13	-0,42 ***	-0,42 ***	-0,42 ***
	[0,14]	[0,14]	[0,14]
14	-0,45 ***	-0,44 ***	-0,45 ***
	[0,13]	[0,13]	[0,13]
15	-0,52 ***	-0,52 ***	-0,52 ***
	[0,13]	[0,13]	[0,13]
16	-0,71 ***	-0,71 ***	-0,71 ***
	[0,14]	[0,14]	[0,14]
17	-0,84 ***	-0,84 ***	-0,84 ***
	[0,13]	[0,13]	[0,13]
constant	5,20 ***	4,97 ***	5,17 ***
	[0,15]	[0,17]	[0,15]
N	1712	1712	1712

These regressions were estimated using data from Time Use in Norway 2010. Robust standard errors are given in parenthesis under coefficients. The individual coefficient is statistically significant at the (***) 1% level, (**) 5% level or at (*) 10% level using a two-sided test.